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HHAR
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11/22/11

Re: EW HHRA -- memorandum regarding status of arsenic as a risk driver - EPA comments

Ravi Sanga to: Suzanne Replinger 11/22/2011 09:53 AM

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From: Ravi Sanga/R10/USEPA/US
To: Suzanne Replinger <SuzanneR@windwardenv.com>
Cc: "Dan Berlin (dberlin@anchorqea.com)" <dberlin@anchorqea.com>, "Debra Williston (debra.williston@kingcounty.gov)" <debra.williston@kingcounty.gov>, "Debra Williston (b) (6)" "Gary Pascoe (b) (6)"

Suzanne -- EPA has reviewed the Memorandum Regarding the Status of Arsenic as a Risk Driver for Seafood Consumption. More discussion between EPA and the EWG is needed regrading the data used to make the determination of background. If clam burrowing depth is shifting from 45 cm to something more reflective of the clam species seen in the more marine EW relative to the LDW, then a corollary consequence is that background must be determined using bivalves other than Mya. The locations of background samples need to be reviewed by EPA to verify that there aren't local arsenic sources.

Please contact me to set up a meeting to discuss this further.

regards,

Ravi

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Suzanne Replinger Ravi and Lon - As we discussed during our call... 10/21/2011 04:06:55 PM

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Date: 10/21/2011 04:06 PM
Subject: EW HHRA -- memorandum regarding status of arsenic as a risk driver

Ravi and Lon –

USEPA SF
1387839

As we discussed during our call on October 6th, the attached memorandum was prepared to document the EWG's rationale for removing arsenic from the list of risk drivers based on seafood consumption in the EW HHRA.
Please let us know if you have any questions.
Thanks!

Suzanne

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Please note that I will be out of the office starting Monday, October 24, and will return on Tuesday, November 1.

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Status of arsenic as risk driver in EW HHRA_memorandum_10.21.2011.docx

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MEMORANDUM

To: Ravi Sanga and Lon Kissinger, US Environmental Protection Agency

From: Windward Environmental LLC on behalf of the East Waterway Group

Subject: Proposed revision to the status of arsenic as a risk driver based on seafood consumption for the East Waterway Human Health Risk Assessment

Date: October 21, 2011

During the process of revising the draft East Waterway (EW) human health risk assessment (HHRA) for submittal to the US Environmental Protection Agency (EPA) on September 30, 2011, the East Waterway Group (EWG) re-examined the arsenic background incremental risk analysis. As a result of this re-examination, the group concluded that arsenic should not be considered a risk driver for the seafood consumption scenarios.

This memorandum summarizes the incremental risk analysis for arsenic presented in the HHRA and documents the EWG's proposed approach for arsenic.

SUMMARY OF THE INCREMENTAL RISK ANALYSIS IN THE HHRA

Section B.5.5.1.2 of the EW HHRA presents an analysis of the incremental risks for arsenic for the seafood consumption scenarios (i.e., the difference between the EW risks and the risks calculated using background arsenic data). As discussed in detail in the HHRA (and in Attachment 5 of the HHRA), the background arsenic tissue data were collected as part of the Lower Duwamish Waterway (LDW) remedial investigation (RI) sampling program and consisted of tissue data from two types of background locations: areas influenced by stack releases from the Asarco smelter (i.e., Asarco-influenced) and areas outside of the Asarco smelter influence (i.e., non-Asarco). Table 1 presents a summary of the inorganic arsenic tissue concentrations in the EW and in both background areas (i.e., both Asarco-influenced and non-Asarco). As can be seen in Table 1, tissue concentrations in samples collected from the EW are generally similar to those collected from either Asarco-influenced and/or non-Asarco-influenced background areas.

Table 1. Inorganic arsenic tissue concentrations

Seafood Consumption Categories	Inorganic Arsenic Concentrations (mg/kg ww)					
	Mean Values			EPCs[a]		
	EW	Asarco-Influenced	Non-Asarco	EW	Asarco-Influenced	Non-Asarco
Clams						
Clams (mixed species)	0.17	0.31	0.12	0.22	0.46	0.28
Crabs						
Crab, edible meat	0.032	0.018	0.023	0.036	0.03	0.03
Crab, whole body	0.042	0.037	0.11	0.047	0.05	0.1
Fish						
Benthic fish, fillet	0.0050	0.0019	0.0026	0.0045	0.004 (max)	0.004 (max)
Benthic fish, whole body	0.032	0.011	0.018	0.038	0.015	0.025
Pelagic fish, perch	0.021	0.008	0.02	0.027	0.01 (max)	0.03

[a] As discussed in the EW HHRA, ProUCL was used to calculate a 95th UCL for use as the EPC.

EPC – exposure point concentration
EW – East Waterway
HHRA – human health risk assessment
UCL – upper confidence limit on the mean
ww – wet weight

Section B.5.5.1.2 of the EW HHRA presents incremental cancer risk estimates for the seafood consumption scenarios using both Asarco-influenced and non-Asarco-influenced background data (Table 2). As would be expected based on the similarities in EW and background inorganic arsenic concentrations, incremental risks were equal to zero for all three of the reasonable maximum exposure (RME) seafood consumption scenarios using both Asarco-influenced and non-Asarco-influenced background risk estimates. For the non-RME scenarios, incremental risks were also equal to zero, except for three scenarios for which the incremental risk was equal to 1×10^{-6}.

Table 2. Incremental cancer risk estimates associated with inorganic arsenic for the seafood consumption exposure scenarios

Exposure Scenario	Dietary Composition	EW Excess Cancer Risk	Incremental Excess Cancer Risk[a]	
			Asarco-Influenced Background	Non-Asarco Background
Adult tribal RME (Tulalip data)[b]	mixed diet	2×10^{-4}	0	0
Adult tribal CT (Tulalip data)[b]	mixed diet	1×10^{-5}	0	0
Child tribal RME (Tulalip data)[b]	mixed diet	4×10^{-5}	0	0
Child tribal CT (Tulalip data)[b]	mixed diet	4×10^{-6}	0	1×10^{-6}
Adult tribal (Suquamish data)[b]	mixed diet	2×10^{-3}	0	0
Adult API RME[b]	mixed diet	8×10^{-5}	0	0
Adult API CT[b]	mixed diet	2×10^{-6}	0	1×10^{-6}

Exposure Scenario	Dietary Composition	EW Excess Cancer Risk	Incremental Excess Cancer Risk[a]	
			Asarco-Influenced Background	Non-Asarco Background
Adult one meal per month	clam	1×10^{-5}	0	0
	pelagic fish, perch	2×10^{-6}	1×10^{-6}	0
	pelagic fish, rockfish	7×10^{-7}	nd	nd
	crab	2×10^{-6}	0	0
	benthic fish	3×10^{-7}	0	0

[a] Incremental risk estimates were equal to zero when EW concentrations were equal to or less than background concentrations.

[b] No mussel data were available. When the CDI and risk values were calculated, the portion of seafood consumption that had been assigned to mussels was divided proportionally among the remaining consumption categories. In addition, surrogate species were used for consumption categories for which no background data were available (crab data were used to represent geoduck, and perch data were used to represent rockfish).

API – Asian and Pacific Islander
CDI – a chronic daily intake
CT – central tendency
EW – East Waterway
nd – no data
RME – reasonable maximum exposure

PROPOSED REVISION AND ARSENIC IN THE FS

In the current draft of the EW HHRA (September 30, 2011), arsenic is identified a risk driver for the seafood consumption pathway. However, based on a re-examination of the incremental risk analysis, the EWG believes that arsenic should not have been identified as a risk driver. The incremental risk analysis indicates site-related cancer risks are either not elevated above background or are equal to 1×10^{-6} for some of the non-RME scenarios. EPA guidance identifies a cancer risk range of 1×10^{-6} to 1×10^{-4} below which action may not be warranted, and does not recommend identifying a chemical as a risk driver when site-related risks are not elevated when compared with risks based on background concentrations (EPA 2002). In addition, EPA guidance (2005, 2002) states that in general, cleanup of chemicals below background concentrations is not required. Thus, the EWG proposes to remove arsenic from the list of risk drivers based on seafood consumption. Arsenic will remain a chemical of concern (COC) for the seafood consumption scenarios based on the overall magnitude of risk for the EW (before consideration of background). Thus arsenic will be monitored in seafood tissues as part of the long-term monitoring requirements for the site, which will be identified as part of the FS.

It should be noted that arsenic will remain a risk driver for the direct sediment exposure scenarios and thus will be a focus of the feasibility study (FS). The preliminary remediation goal (based on a comparison with the Lower Duwamish Waterway FS) for the direct contact RME scenarios at the EW site will likely be based on background concentrations, and thus the elimination of arsenic as a risk driver based on seafood consumption is not expected to impact the development of remedial alternatives in the FS.

REFERENCES

EPA. 2002. Role of background in the CERCLA cleanup program. OSWER 9285.6-07P. US Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, Washington, DC.

EPA. 2005. Contaminated sediment remediation guidance for hazardous waste sites. OSWER 9355.0-85. EPA-540-R-05-012. US Environmental Protection Agency, Office of Solid Waste and Emergency Response Washington, DC.